March 4th, 1955

Dear Dr Commoner,

My first photograph of your B8 gives a rather intriguing result. The fibre- axis repeat which correspond, in TMV, to the pitch of the helix, has increased from 23A to ~~27A~~ 27A. Rich and Dunitz found, for Newmark's protein X, that the pitch had decreased by about 5% with respect to TMV. They worked with dry orientated material (and are now proposing to look at gels). In TMV, the pitch is the same for the dry material and the gel. So that my result seem to suggest that, althoug the protein alone has the property of polymerising into a helical TMV-like structure, the RNA core is necessary to keep it properly fixed in position. In the absence of the core, it can apparently undergo a change similar to the stretching of a spring. This is, of course, consistent with your observation that B8 is slightly less rigid than TMV.

You mentioned that you have a further 10 m.g. of this preparation which you could send me if necessary. Is it possible to obtain B8 as a spontaneously and homogeneously birefringent solution? If it is, and if you were able to concentrate a second batch into this form before sending, it would be very much worth while. There not being an ultracentrifuge anywhere in this college, I concentrated the solution you sent me simply by allowing it to evaporate slowly through the dialysis bag. This produced a gel which could be seen, in the microscope, to be a 2-phase system containing fibrous regions of rathe low birefringence, suspended in a non-birefringent solution. My X-ray photograph is of this fibrous gel. Orientation of such a material is never very good. I have tried the obvious things, such as changing the pH and adding small quantities of salt, but failed to obtain a homogeneous birefringemt solution.

As this 'fibrous gel' state often occurs in TMV also, I am hopeful that correct treatment might produce a homogeneous concentrate from B8. If this is so, there is no reason why I should not get photographs from B8 as good as those from TMV. Moreover, the opening and closing of the structure by adding and removing water gives interesting possibilities from the point of view of X-ray studies. My

present photograph shows little detail other than the strog meridional (or near-meridional) maxima, and it is unlikely that I can get much more out of it unless the orientation can be greatly improved.

In preparing a dry specimen (which I have not yet photographed) I observed that the birefringence changes from positive to negative on drying. Rich reports that the birefringence of protein X is positive. Isn't this difference rather surprising?

I shall let you know of any further progress. Meanwhile i should very much like to have your comments on what has happened so far, and on the possibility of obtaining a homogeneous strongly birefringent concentrate.

Yours sincerely

RosalindFranklin